MANPRINT BULLETIN

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FOCUS ON TRAINING

Training Systems R&D Program: Progress and Challenges

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Editor's Note: The following is a summary of an article appearing in the "9th Interservice Training Conference Proceedings." Because of limited space, we were forced to edit out many of the details contained in the original.

The development of sophisticated and complex training systems continues to develop explosively. This technological growth, however, is offset by the fact that the cost and potential training benefits of alternative approaches or the training effectiveness of the training systems that we field are not always considered. The Army Research Institute (ARI) and the Program Manager for Training Devices (PM TRADE) have embarked upon a joint program to develop new tools and capabilities which can lead to the solution of these problem areas. Key challenges include:

- Development of comprehensive training solutions that will ensure cost-effective, responsive training
- Simulation and fidelity questions--how much is enough to satisfy the training requirement?

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A FOCUS ON TRAINING

The Secretary of the Army and the Army Chief of Staff have designated Training as the Army theme for 1988. As one of the six domains of MANPRINT, Training is critical in MANPRINT's effort to enhance total system performance. This special issue will focus on Training from a MANPRINT perspective.

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"Remember the Soldier"

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- Disciplining the design process to focus on the affordability of training solutions and a required performance outcome
- Measurement of training results
- Adding training value
- Training to fight (e.g., through SIMNET) rather than merely training to operate
- Timely development of training systems parallel to the weapon system development process to meet MANPRINT goals
- Presentation of information through new technologies such as embedded training and videodisc training devices.

The primary goal of this joint venture is to permit the evaluation of training alternatives with respect to desired effectiveness at minimum cost, or maximum effectiveness at a given cost. To achieve this goal, a computer-based system with supporting procedures is being developed to permit interactive utilization by multi-disciplined teams in support of the training development process.

The large body of training technology and information currently available needs to be organized in a comprehensive and systematic way. This joint venture is relying on the power of new computer systems and networks to implement the required analytical and analog models and their supporting databases. A sufficiently flexible system will allow different users to come up with different solutions to the same problem while providing a design rationale and audit trail for the decisions that they have made.

Our first project involves an effort to interface with early weapon system development through the MANPRINT initiative. Techniques are being developed that will evaluate the impact of different weapon system design concepts on training requirements, assess the costs of potential training systems needed to meet these requirements, and identify early candidates for embedded training.

Our second effort addresses the formal training development process and the development of a training strategy or system that will put various approaches in context for parallel development with that of the weapon system. Another major effort involves the Optimization of Simulation Based Training Systems (OSBATS), a family of computer-based models that determines during the concept formulation process how much simulation is needed.

Because of limited space, this article will highlight ARI/PM TRADE's efforts on behalf of the MANPRINT initiative and embedded training.

MANPRINT Initiatives

MANPRINT goals and objectives require that the manpower, personnel and training requirements of alternative weapon systems design concepts be accurately estimated early in the development process. The impact of different design concepts and alternatives on training requirements must be assessed as well during the conceptual phase of weapon system development.

MANPRINT Techniques for Early Training Estimation

Early determination of training requirements and their associated training resources can help to optimize the design of the total weapon system. In addition, those portions of the training requirement that should be satisfied by embedded training must be identified. The ARI/PM TRADE project aims toward integrating active consideration of training into the earliest stages of the Life Cycle Systems Management Model (LCSMM) so that the design of the operational system and its supporting training system will be optimized.

To this end, we are developing a technique that will provide an early estimate of the training requirement impact of a weapon system concept, which in turn will help to assess the impact of this concept on Army training resources (cost, number of instructors, training devices, etc.). During the development of an Operational and Organizational (O&O)Plan, or subsequently during further refinement and development of the design concept, a framework is needed to consider the following aspects of MANPRINT:

1. Number and type of MOS and /or quality level of personnel
2. Jobs or tasks relative to the specificity of the emerging concept
3. Identification/definition of man/machine interfaces
4. Functions allocated to man or machine
5. Knowledges and skills required by operator/ maintainer functions.

The Early Training Requirements (ETR) data for a weapon system alternative will be stated at a gross

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Training Systems R&D *(continued from page 2)*

level (i.e., functions and tasks); the detailed training requirements (i.e., skills and knowledge required to perform the functions and tasks) would be detailed later as a part of training requirements analysis. We are currently developing an "organizational framework" that will identify the requisite ETR data and that will serve as a basis for integrating this data. The completed database "framework" will represent the ETR from which initial training resource estimations can be made, and early embedded training candidates can be identified. It will also be used to represent the MANPRINT inputs for subsequent training requirements analysis, and should be of form and character to support the simulation, if desired, of the man-machine interfaces represented.

Strategies for the Early Estimation of Required Training Resources

The purpose of this task is to develop techniques and tools which will use the ETR to identify initial training strategies so that estimates of required training resources can be made. These tools will allow designers to assess the impact of the ETR on individual training in the institution and the unit, as well as collective training in the unit, enabling the training developer to define initial training strategies at a general/macro level. The macro-training strategies will be developed relative to basic weapon system or functional classes. These estimates will be configured to permit rough relative training resource estimates to be made between competing weapon system candidates.

Early Estimation of Embedded Training Candidates

A tool is under development that will allow training developers to determine, in a timely fashion, the best candidates for embedded training, using as input the data associated with the ETR. Issues in its development include determining (1) which tasks and content domains are best suited for embedded training, taking into account the characteristics of the weapon system itself, and (2) the level to which these tasks be trained, taking into account the equipment, the environmental requirements, and the instructional needs of both active and reserve trainees.

Embedded Training

The Army defines embedded training as "training that is provided by capabilities designed to be built into or added onto operational systems to enhance or maintain the skill proficiency necessary to operate and maintain that equipment end item." Current Army policy advocates the consideration of embedded training as a first alternative but not for exclusive use; it further requires that embedded training will not interfere with the operational requirements/capabilities of the system, and will train individual tasks through force-level tasks as required. Army policy goals are to include a training strategy in the O&O Plan and to develop training requirements and resources during system concept formulation; to analyze and provide a rationale for either including or not including embedded training at each materiel decision process milestone; and to identify the MANPRINT and Integrated Logistics Support (ILS) processes as the catalyst for considering embedded training in the pre-concept formulation and subsequent prototyping phases.

Consistent with this policy, PM TRADE has established the following objectives relative to embedded training: (1) achieve a top-down systems engineering approach to the definition and development of training systems at all levels beginning in earliest concept phases, (2) integrate training strategies and resources across functional areas to avoid redundant capabilities, and (3) ensure the fullest integration of available technology, device, simulators and embedded training to achieve the most effective training at the lowest cost.

Our research objectives are to (1) identify those conditions that call for the inclusion of embedded training in weapons systems under development, (2) identify functions and tasks (by weapon system class class) which best lend themselves to embedded training, (3) identify critical design tradeoffs related to embedded training, and (4) organize current and existing information relating to embedded training. Our joint project aims to provide insight into such issues as how embedded training best complements other training techniques; the implications of different engineering configurations for classes of materiel end items; the optimum formats for presenting embedded training information; the interface requirements among materiel, combat, and training developers; the special implications of embedded training categories, such as individual, team functional and force level; and the engineering, operations, and logistics impacts in terms of life cycle costs, reliability and supportability.

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Training Systems R&D *(continued from page 3)*

All of the ARI/PM TRADE research and development efforts are being related to the weapon and training system development procedures of the Army they are designed to support. These include the Required Operational Capability (ROC), Operational and Organizational (O&O) Plan, Training Device Needs (TDN), and Individual and Collective Training Plans (ICTP). The relationship between the technology base and operational base will be made explicit at every point.

ARI and PM TRADE, with the active support of the Army training community, are collectively applying a systems engineering focus to the training development process. This joint program should be instrumental in improving the effectiveness of weapons training systems.

For more information, contact Dr. Ronald Hofer, PM TRADE, Orlando, FL, (407) 646-4747.

Do Not Disturb . . .

Embedded Training in Progress!

Cartoon courtesy of Judy Hicks

Notice

July MSOC Cancelled

The MANPRINT Staff Officers Course (MSOC) scheduled for 11-29 July 1988 has been cancelled.

New Points of Contact List

The MANPRINT Points of Contact List has been mailed out. If you have not received a copy, contact Ms. Kristy Underwood at ARS, 4401 Ford Avenue, Suite 400, Alexandria, VA 22302, or telephone (703) 820-9000.

★★★★

TRADOC MANPRINT UPDATE

CDR TRADOC FT MONROE VA//ATCD-SP//
AIG 7443

SUBJECT: MANPRINT Update Message No. 88-3, System MANPRINT Management Plan (SMMP) Approval Procedures

A. MSG, CDR, TRADOC, ATCCD-SP, 241700Z MAR 88, SAB. (NOTAL)

1. The purpose of this update message is to announce the policy for developing the SMMP as an AMC/TRADOC jointly approved document. This policy was sent to the TRADOC and AMC subordinate commanders as a joint message (REF A).

2. Effective immediately, the SMMP requires dual approval by the TRADOC Proponent School Commandant and the Commander of the Aligned Major Subordinate Command (MSC). Approval of SMMPs for In-Process Review (IPR) systems may be delegated to Directorate/Division (LTC/COL or GM-14/15) level at the discretion of the Commandant/Commander. Delegation of approval authority for IPR systems should be decided between the respective TRADOC Commandant and MSC Commander.

3. This procedure will make the SMMP a fully coordinated and approved TRADOC/AMC plan for managing MANPRINT throughout the acquisition cycle. The combat and materiel developers will develop a close working relationship early in the acquisition process which will lead to better planning and resourcing of MANPRINT tasks and analyses.

4. This policy will be incorporated in TRADOC/AMC PAM 602-XX, which is targeted for publication in 3QFY88.

5. HQ TRADOC Combat Developments MANPRINT POCs are: Ms. Swafford, CPT Streater, Mr. Dwyer: ATCD-SP, AV 680-4225/4227.

Life Cycle Contractor-Delivered Training

by MAJ Charles J. Hintze
U.S. Army Research Institute

The Army is considering procuring life cycle contractor-delivered training (LCCDT)— or turn-key training, as it is also known—for operators, maintainers, and support personnel of selected new weapon systems. LCCDT is defined as the design, development, and implementation of the training system over a weapon system's life cycle. LCCDT will replace the traditional training military approach to allow the reassignment of Army personnel from training to operational units.

The U.S. Army Research Institutue for the Behavorial and Social Sciences has conducted the first in-depth analysis of LCCDT; the information in this analysis may be useful to government training and program management personnel who are considering LCCDT for their particular weapon system. The analysis identifies military contractor-delivered training programs and their efficacy, isolates the important variables in these programs, and subsequently identifies the quantitative and qualitative benefits and drawbacks associated with these variables. Major dimensions discussed in the analysis (identified for government or contractor) include: program of instruction developer; training device designer; training management; training materials ownership; and training site.

ARI identified six categories of criteria that are needed in order to conduct a comprehensive evaluation of contractor-delivered training proposals. These criteria include adequacy of instructional features, training management, personnel qualifications, corporate capabilities, personnel requirements, and dollar costs. Components and standards for each category are proposed.

A cost and required personnel comparison of government versus contractor-delivered training is discussed in detail along with recommendations for maximizing government benefits while minimizing costs. To maximize the benefits of LCCDT programs, government program personnel should consider: (1) contractor designed and developed training systems with government monitoring; (2) the use of only experienced instructors; (3) contractor training program management with limited government monitoring; (4) contractor training system ownership but technical data package available to the government for breakout of costly components; (5) both weapon and training system developed in a single contract; and (6) the use of government facilities for low density training. To minimize LCCDT costs, the contractor should employ permanent area residents and not be allowed to pay special assignment bonus, travel, and per diem. In addition, contractor-provided office space should be kept to a minimum.

For further information, contact MAJ Charles J. Hintze, U.S. Army Research Institute for the Behavioral and Social Sciences, ATTN: PERI-SM (Ms. Finley), 5001 Eisenhower Ave., Alexandria, VA 22333-5600, AV 284-8917 or COM (202) 274-8917.

MANPRINT: A Program View

by LTC Keith Fender
MANPRINT, Research and Studies Directorate,
HQDA (ODCSPER)

Recent communications from the field show that it is easy to lose sight of the fact that the essence of MANPRINT is not the six domains, but rather, the integration of human performance in the acquisition process.

How do we assure such integration? Government and industry must continue to develop and test integration tools that will ensure communication, non-duplication of effort, early trade-offs, and an accurate audit trail. The government not only needs to specify the requirement for integration in the RFP Statement of Work (SOW), but should also provide a Contract Data Requirements List (CDRL) item for a deliverable that reports the results of an integrated MANPRINT program. Only then can the analysis required for integration be costed; only then will it become a reality. Without such specification, the domains will be treated separately, and groups will be content to work within their stovepipes.

Integration—both within the domains and between the domains and the acquisition systems—is the key to success. To facilitate this MANPRINT goal, "how to" will continue to be developed and documented.

Guidelines for Embedded Training

The Army Research Institute (ARI) and Project Manager Training Devices (PM TRADE), in partnership with the Training and Doctrine Command (TRADOC), are producing ten volumes of guidelines and procedures for implementing embedded training (ET). These volumes present "how to do ET" information for training, combat, and materiel developers, as well as for contractors. The series share the general title of "Implementing Embedded Training (ET)," with specific descriptive subtitles for each volume. They are:

Volume I:	Overview
Volume 2:	ET as a System Alternative
Volume 3:	The Role of ET in the Training System Concept
Volume 4:	Identifying ET Requirements
Volume 5:	Designing the ET Component
Volume 6:	Integrating ET with the Prime System
Volume 7:	ET Test and Evaluation
Volume 8:	Incorporating ET into Unit Training
Volume 9:	Logistics Implications
Volume 10:	Integrating ET into Acquisition Documentation

Volumes 1-5 are now available from ARI. Drafts of volumes 6-10 are expected to be available by June 1988. National Technical Information Service (NTIS) numbers will be announced as they are issued.

For more information, contact Ms. Dorothy Finley at the U.S. Army Research for the Behavioral and Social Sciences, ATTN: PERI-SM (Ms. Finley), 5001 Eisenhower Avenue, Alexandria, VA 22333-5600, AV 284-8876 or COM (202) 274-8876.

"The truth is that the most expensive weapon that technology can produce is worth not one iota more than the skill and will of the man who uses it."

GENERAL BRUCE C. CLARK
circa 1959

MANPRINT-Related Publications Available from the Defense Technical Information Center (DTIC)

The following MANPRINT-related publications are available from the Defense Technical Information Center (DTIC) for agencies of the Federal government and government contractors holding DTIC accounts. There are many other materials available from DTIC that would be helpful to those in need of MANPRINT-related information; we will print a more extensive list in future issues of the *MANPRINT Bulletin*.

Army Manpower Cost System (AMCOS) Economic and Budget Cost Models.
AD-A162 581

Early Comparability Analysis (ECA) Procedural Guide.
AD-A181 260

Human Factors Engineering Data Management Handbook.
AD-A179 691

Human Factors Engineering Material for Manpower and Personnel Integration (MANPRINT) Provisions of the Request for Proposal (RFP).
AD-A175 186

Integration and Application of Human Resouce Technologies in Weapon System Design: Consolidated Data Base Functional Specification.
AD-A059 298

Integration of MPT (Manpower, Personnel, and Training) Supply and Demand and the System Acquisition Process.
AD-A130 229

MANPRINT Handbook for RFP (Request for Proposal) Development.
AD-A188 321

MANPRINT On-Line.
AD-A182 283

MANPRINT Risk Assessment.
AD-A185 995

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McCommons' Laws

by R. Bruce McCommons
U.S. Army Human Engineering Laboratory

Editor's Note: Due to popular demand, we are pleased to reprint this article last published in the January 1987 issue of the Bulletin. You may notice that Mr. McCommons has added a 29th "law" to this year's version. Enjoy!

While the Army has invented and is in the process of institutionalizing MANPRINT, it must be recognized that the bulk of MANPRINT activities will be done by contractors. For this reason, it will be extremely important that these contractors know precisely what is expected of them in terms of implementing MANPRINT requirements. The proper vehicle for transmitting this information is the Request for Proposal (RFP).

Contrary to a popularly held belief, most contractors do a good job of honoring their commitments—as they understand them. When disputes regarding contract performance arise, it is often because the government has failed to clearly or fully communicate its work and/or system design requirements via the RFP. Even in such cases, however, the government is not always the only culprit. Although they are encouraged to do so, offerors have absolutely no obligation to point out weaknesses, discrepancies, or even inanities in a government solicitation. Thus, they seldom do, and the typical proposal becomes a mirror image of the requirements expressed in the Statement of Work (SOW) and system specifications. Under such circumstances, any given contract will be only as strong as the RFP which spawned it.

When a contract is ambiguous or remiss, misconstructions leading to disputes are almost guaranteed. Most of these situations could be avoided, however, by judicious preparation of the RFP. And, while it would be desirable for contractors to share this burden, the government must accept the ultimate responsibility.

"McCommons' Laws" are really a compendium of lessons learned during eighteen years of administering contracted human factors engineering programs; they are directly traceable to mistakes found in RFPs which later led to program difficulties. The "laws" have been expanded and modified somewhat to accommodate the MANPRINT initiatives.

For more information, contact R. Bruce McCommons, U.S. Army Human Engineering Laboratory, SLCHE-ER, Aberdeen Proving Ground, MD 21005-5055, AV 298-5175 or COM (301) 278-5175.

McCommons' Laws

by R. Bruce McCommons
U.S. Army Human Engineering Laboratory

1. The most important part of MANPRINT is the last three letters.

2. Being expert in one or more MANPRINT domains is not enough. To promote MANPRINT effectively, one also requires a comprehensive knowledge of the materiel acquisition process and at least a rudimentary knowledge of the associated procurement regulations and contracting procedures.

3. Materiel acquisition is a process, not a series of discrete events that can be addressed or revisited at will. As such, it requires careful planning, continuity of effort, and an audit trail.

4. Know what the contractor and/or program manager knows. Knowing more is even better.

5. Become familiar with the pertinent specs, standards, and regulations, and use them to your advantage.

6. Don't ever take "No" for an answer the first time you hear it.

7. Don't ever take "Yes" for an answer, regardless of when you hear it. Always follow up to assure that promised actions really happened.

8. The two most important activities in a materiel acquisition are the preparation of the RFP and the source selection. Treat them accordingly.

9. A contract is an RFP with the "shalls" changed to "wills."

10. An ECP is something that got left out of the RFP.

11. There is no efficient way to recover from a poorly constructed RFP.

12. Do your homework—there is no such thing as effective "boilerplate."

13. Keep it simple—forget the motherhood.

14. Eschew ambiguity unless you can make it work to your advantage (such opportunities will be extremely rare).

13. Keep it simple—forget the motherhood.

14. Eschew ambiguity unless you can make it work to your advantage (such opportunities will be extremely rare).

15. He who introduces ambiguity gets to live with it later.

16. When preparing RFP inputs, be clear, accurate, and concise, and provide rationale for all inputs. Most probably, you won't be around to protect or explain them when it really counts.

17. In general, citing whole documents (e.g., MIL specs and standards) as requirements is neither allowed nor appropriate—tailor everything.

18. Keep data to the minimum required to accomplish intended purposes.

19. Adding requirements to a DID is not allowed. You might get away with it. You probably won't.

20. A DID without an accompanying work effort (SOW) is nothing more than paper.

21. Citing a document as "Applicable" in Section 2 of a specification without later referencing it in either Sections 3 or 4 is useless.

22. Don't put work statements in the specs.

23. Don't put requirements statements in the SOW.

24. A requirements statement without an accompanying quality assurance (QA) provision is useless.

25. Formal design reviews (e.g., PDRs and CDRs) are not for designing things. They are for making decisions.

26. Contractors only do work they get paid for, i.e., that which is defined in the SOW.

27. There is no way to guarantee a successful MANPRINT program. The best that can be done is to maximize the probability of success by specifying appropriate work, data, and design requirements and then doing your level best to ensure that they are met.

28. Your most important assets are knowledge, determination, a believing and supporting program manager, and an effective contractor counterpart. Luck helps, but don't count on it.

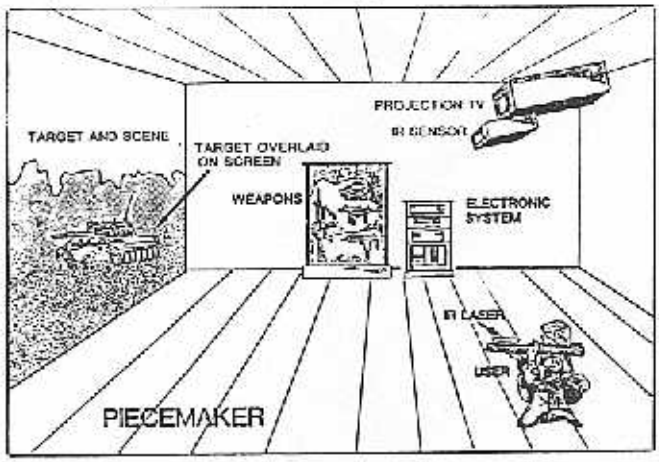
29. You can't have MANPRINT for free—either in terms of cost or schedule.

PieceMaker: Close-Quarters Combat Weapons Training

by Nan B. Irick
Automation Research Systems, Ltd.

The MANPRINT program has shown us that human performance is enhanced when equipment is designed to fit the soldier; total system effectiveness is further enhanced when the soldier is adequately trained to exploit the equipment's full capabilities. New technologies are rapidly paving the way for more efficient, realistic methods of weapons training.

PieceMaker is a DARPA-sponsored, interactive video training product currently under development by Interactive Television Company (ITC), a Rosslyn, Virginia R&D firm. This system is designed to provide close-quarters combat training using computer-modelled ballistic effects and actual video images. Intended for use by soldiers and others who need rapid-decision firing skills, PieceMaker will provide training for a variety of current weapons, including Uzis, M-16s, and Barettas. Training for more sophisticated weapon systems (e.g., TOWs) is being developed as well.



PieceMaker stresses target discrimination skills (friend or foe), accuracy, and timeliness of fire. It is a departure from other training simulators, however, in that it employs unpredictable computer-generated scenarios; hence, the trainee is unable to memorize the program. PieceMaker not only springs surprises on the trainee (e.g., unarmed men on the screen), it reacts to the him as well.

The way PieceMaker works is this (see figure 1): The image of target and scene are separately filmed, digitized, and described to the system, which can then project a component image on a screen to simulate a "hostile" scenario. The target (e.g., terrorist) goes through a random sequence of moves (e.g., standing, running, ducking behind walls) as generated by the computer. Hit areas are also generated: dying sequences, for example, will occur when the target is shot in a predesignated hit area. Because an unarmed target may come up on the screen at any point, the trainee must learn to quickly distinguish hostile from friendly targets.

At the same time that the trainee is shooting at the target, the target may be shooting back at the trainee. The target has been preprogrammed by the trainer to be a poor to perfect shot. The system pieces all of this information together at random, making it virtually impossible for the trainee to know what will happen next.

PieceMaker currently uses actual weapons equipped with a barrel-mounted laser. When the trainee shoots at the component image, the laser emits an infrared beam of light that is detected by a videocamera and reported to the computer. There it is converted to x/y coordinates and matched up with predesignated hit areas based on the weapon's computer-modelled ballistics. The trainee is then computer-scored on the three points mentioned earlier: target discrimination, accuracy, and timeliness of fire.

Variations on the original inert weapon concept are currently under development. One effort involves a live-fire version that will eliminate the laser mounting on the barrel and provide a more realistic approach. Other developments include the use of more sophisticated weapons and targets. For example, tanks could be used as the targets for TOW missile training. Ship and aircraft target versions are also in preliminary design stages.

Testing has gone well, and ITC expects to deliver the live-fire weapon version of PieceMaker later this spring. With new products being developed over the course of the next few years, the training community has much to look forward to in the way of new technology.

For more information, contact Dr. Judith Daly, Tactical Technology Office, Defense Advanced Research Projects Agency (DARPA), (202) 694-2394.

Footprint: One Small Step for MPT
(Part Two)

by Kris Hoffman
Don Johnson
Defense Training & Performance Data Center

Dennis Collins
MANPRINT, Research and Studies Directorate,
HQDA (ODCSPER)

Editor's Note: The following is the second part of an article published in the March/April 1988 MANPRINT Bulletin.

Footprint reports have been delivered to the U.S. Army Infantry School for the AAWS-M and AAWS-H, to the U.S. Army Signal Center for the MCOS, EOTF, and FHMUX, and to the Armored Family of Vehicles Task Force for the AFV. The reports were provided in two different formats—as complete sets of MOS data sets, and as complete sets of MOS reports grouped by system. The AFV Task Force has provided copies of the Footprint reports to its three prime contractors for MPT baseline consideration.

Subsequent to the deliveries, a Joint Working Group (JWG) was formed, comprised of representatives from the Army Office of the Deputy Chief of Staff for Personnel (ODCSPER), Soldier Support Center - National Capital Region (SSC-NCR), Training Performance and Data Center (TPDC), as well as other organizations selected by ODCSPER. One of the primary objectives of the group is the institutionalization of Footprint within the Army as the Automated Target Audience Description Database. Additional areas approved for joint investigation are as follows:

(1) The expansion of Footprint to the other areas required by the TAD guidelines, including anthropometric data, identification of high driver tasks, and performance data.

(2) The expansion of Footprint to include Officer, Warrant Officer, Reserve, and Civilian personnel data.

(3) The process by which the MPT data is updated throughout the acquisition process as more details are learned about the new system.

(4) The best means of providing MPT data to industry for use in the design of new systems within the specified MPT resource constraints.

Potential Applications of Footprint Data

As Army data users reviewed the reports generated by the Footprint prototype effort, a number of potential applications were noted; many of these will be used by the AFV Task Force to support their decision processes. The most significant are summarized below:

MOS to System Crosswalk. What MOS are associated with a particular weapon system or conversely, what are the various systems a specific MOS supports? (This capability will be provided by the Crosswalk project, which when completed, will serve as a front end to the Footprint.)

MOS Restructuring. What is the composition of the present MOS, how are they distributed, and what kind of changes could be made to the organizational concept or force structure to reduce MPT requirements?

MOS Consolidation. When reviewing two or more MOSs, what commonalities exist between them, what unique requirements can be eliminated, and what training packages can be consolidated?

Career Management Field Management. What is the status of the MOS relative to accessions, promotions, and attritions? Which MOS are considered underpopulated or overpopulated relative to authorizations, requirements, and actual inventory?

Generic MOS Functions. When comparing multiple MOS with a common generic function (e.g., driving a vehicle), can training be consolidated, manpower requirements be reduced, and training locations be centralized to reduce training costs?

Weapon System - Manpower Trade-offs. When summarizing the MPT for all MOS that operate and maintain a specified weapon system, can efficient system design eliminate undesired MOS requirements?

Distribution of Quality. When comparing the distribution of quality of a particular (or group of MOS) to the Army average, is an unequal distribution of personnel quality apparent? Is it significant?

Modification to Training Pipeline. When reviewing the training pipeline(s) associated with specific MOS

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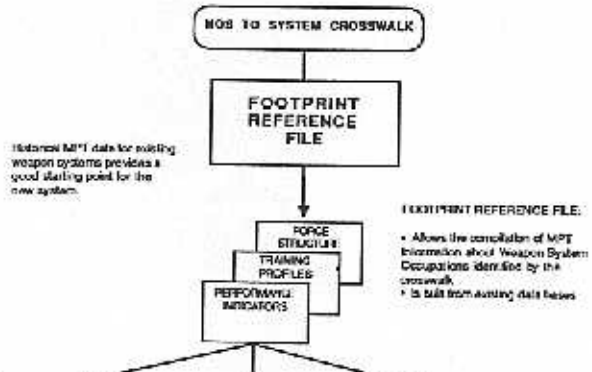
Footprint *(continued from page 8)*

(or groups of MOS), can some high cost or lengthy courses be transitioned to on-the-job training or embedded training, or can training be reduced through the use of job-aiding or expert systems?

Cross Service Data Exchange. Do comparable systems exists in the other services? What are their associated MPT profiles?

Results of the Footprint prototype have demonstrated that the integration of existing data serves a multiplicity of purposes that in most cases is quite different than those of the contributing data source. This synergistic effect enables the generation of a wide variety of MPT reports in a fraction of the time previously possible. It provides a historical perspective on various MPT facets which can be used to track MPT changes and reveal significant trends, and can serve as an automated means of modelling a vast number of variables so that required trade-offs may be assessed.

Initial discussions with the other services indicate that Footprint is not only feasible for them, but that the burden of specific MPT requirements could be greatly reduced through the development of such a tool. Whether or not it is developed within each of the services or at a centralized data center such as TPDC, the resulting integrated data set presents a huge potential for identifying MPT constraints early on in the acquisition process.



Footprint in Support of the Weapon System Acquisition Cycle

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The Footprint project is not an end unto itself. Although the term "Footprint" originally referred to the MPT profile of an existing system, the project has demonstrated that MPT reports can also be provided for any MOS at any point in the acquisition process whether they are associated with the predecessor system, comparable system, or new system. Current efforts are focusing on an integrated approach which will interactively support existing analytical techniques. This capability may one day provide an automated means of generating initial MPT reports, updating and modelling variations, and projecting MPT estimates.

Footprint is one small step for MPT, but one large step towards improving the weapon system acquisition process.

For more information, contact MAJ Gregory D. Citizen, SSC-NCR, AV 221-0272, COM (703) 325-0272, or LTC Rudy Laine, ODCSPER, AV 225-9213, COM 695-9213.

DTIC *(continued from page 6)*

A Review of Major Issues Relating to Human-Machine Integration in the Development of Military Systems.
AD-A136 739

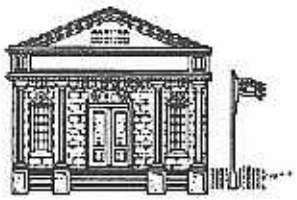
System MANPRINT Management Plan (SMMP) Procedural Guide.
AD-A171 130

Training Requirements for the Battlefield Management System (BMS): A Preliminary Analysis.
AD-A185 468

To order materials or obtain abstracts, contact: DTIC, Cameron Station, Alexandria, VA 22304-6045. Telephone: AV 284-7633, or COM (202) 274-7633.

"Government/Industry Relationship: Teaming for Success" Conference

A "Government/Industry Relationship" conference will be held at the Defense Systems Management College, Ft. Belvoir, VA, on May 17-19, 1988, and will feature speakers, panels, and workshops focusing on current issues in defense acquisition. See "Meetings of Interest" on page10 for contact information.



Schedule of MANPRINT Courses for FY88

MANPRINT Senior Training Courses

23-27 May 88 (TACOM) 1-5 Aug 88 (Monmouth)
20-24 June 88 (Knox)* 29 Aug-2 Sep 88 (Gordon)

** changed from 27 Jun - 1 Jul 88*

MANPRINT Staff Officers Courses**

2-20 May 88	8-26 Aug 88
6-24 June 88	12-30 Sept 88

Note: The 11-29 Jul 88 MSOC has been cancelled.

**All courses will be held at the Casey Bldg., Humphrey's Engineer Support Activity Complex, Ft. Belvoir, VA.

MANPRINT INFORMATION

POLICY - MANPRINT, Research and Studies Directorate, HQDA (DAPE-MR). Washington, DC 20310-0300. AV 225-9213, COM (202) 695-9213.

MANPRINT TRAINING - Soldier Support Center-National Capital Region, ATTN: ATNC-NM, Alexandria, VA 22332-0400. AV 221-3706, COM (703) 325-3706.

PROCUREMENT & ACQUISITION - US Army Materiel Command, ATTN: AMCDE-PQ, Alexandria, VA 22333-0001. AV 284-5696, COM (202) 274-5696.

HUMAN FACTORS ENGINEERING STANDARDS AND APPLICATIONS - Human Engineering Laboratory - MICOM Detachment, ATTN: SLCHE-MI, Redstone Arsenal, AL 35898-7290. AV 746-2046, COM (205) 876-2048.

MANPOWER, PERSONNEL AND TRAINING RESEARCH - Army Research Institute, ATTN: PERI-SM, Alexandria, VA 22333-5600. AV 284-9420, COM (202) 274-9420.

9-11 May 1988

Human Factors Engineering Technical Group Meeting. Baltimore, MD. Contact: Louida Murray, 6714 West Geddes Ave., Littleton, CO 80123. Telephone: (303) 979-7441.

10-13 May 1988

Applications of Human Performance Models to System Design: A Technology Demonstration Workshop. Orlando, FL. NATO sponsored. Contact: Dr. Michael H. Strub, US Army Research Institute-Fort Bliss Field Unit, PO Box 6057, Ft. Bliss, TX 79906-0057.

17-19 May 1988

Government/Industry Relationship: Teaming for Success. Defense Systems Management College, Ft. Belvoir, VA. Contact: DSMC Alumni Assn., 966 Hungerford Dr., Suite 10-B, Rockville, MD. Telephone: (301) 294-8710.

7-10 June 1988

Engineering for Man-Machine Systems: Human Performance for System Designers. Univ. of Dayton, Dayton, OH. Contact: Jeffrey Landis, Research Institute, KL 462, Univ. of Dayton, Dayton, OH 45469-0001. Telephone: (513) 229-3221.

GENERAL INFORMATION

• Proposed articles, comments, and suggestions are welcomed, and should be mailed to: MANPRINT Bulletin, ATTN: HQDA (DAPE-MR), Washington, D.C. 20310-0300. Telephone: AV 225-9213, COM (202) 695-9213.

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